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AMCIS 2010 Proceedings

Americas Conference on Information Systems (AMCIS)

8-2010

Comparing the Quality of Latin American e-Health National Websites

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ABSTRACT

This study proposes an e-Health taxonomy based on the assessment of 10 e-Health National Websites. The findings show that the degree of development of e-Health in Latin America is not homogeneous, they do not have the same standards, and they differ in their level of development. In general, the analyzed countries need to improve their e-Health initiatives in terms of diffusion, participation, and standardization. It should be reflected in collective work among governments and companies in the health industry. In this sense, our taxonomy provides governments with a general approach to the main important factors to elaborate, develop, and implement this kind of solutions. Furthermore, based on these results, governments could reinforce the factors that follow some specific dimension. Finally, we want to highlight that these initiatives should be used to reduce the digital gap, especially for access of minorities.

Keywords

e-Health, Latin America, e-Health National Websites, e-Health Taxonomy.

INTRODUCTION

Information society, and especially Internet, is doing changes in the way how people interact and get information. The easy access and the potential to find information about any topic, in combination with the availability of Internet not only at work, but also at home, social centers or libraries; become Internet in a very important tool that many people use to find information about their health or that their children. In the last years, public administrations have been doing huge efforts to improve the implementation and use of information technologies in e-Government initiatives. One of the main goals of e-Government is to promote the use of Information and Communication Technologies (ICTs) in various fields, including health. In this context, e-Government has a significant role because it can be used to have greater proximity to citizen, for that reason it is important to understand better the different initiatives that different countries have been working with.

Based on international standards and best practices in publication and disclosure of health information, we have built on a previous study that contains 13 factors proposed by Esteves and Bohórquez (2009). We have added 5 factors to evaluate WebPages of 10 Latin American Health Ministries taking into account specially prevention initiatives. After that, we have classified each factor by country in their correspondent dimension to diagnosis the level of maturity and to propose a taxonomy as a reference to the assessment of e-Health initiatives in Latin America.

This paper is structured as follows. First, we analyze previous studies to indentify the state-of-art. Next, we report the research methodology. Then, we present our preliminary results. Finally, we draw some conclusions and further work.

LITERATURE REVIEW

e-Health

Although everyone talks about e-Health, few people have a clear definition of its meaning. The main idea is that Internet has created new opportunities and challenges for traditional health sector. Therefore, we could say that this is a concerted effort among leaders of health sector and high technologies to fully exploit the benefits available through convergence of Internet and health care (Eysenbach, 2001). Rodrigues and Risk (2003) consider that the majority of e-health solutions are based on strategies and experiences of e-government and e-commerce, using Internet-based technologies to rethink, redesign and reshape how business and public services work today. Typically, such developments have helped to enhance productivity, effectiveness, and efficiency, not only internally but also externally, in relationships with customers, suppliers, and partners. Oh, Rizo, Enkin and Jadad (2005) found that technology has been seen from a dual perspective: as a tool to allow the

process/function/service of e-health, and as a single entity encompassing e-health itself. It should be emphasized that technology must always be considered as a tool and not as an end in itself, in addition, by breaking down the e-Health in its main components, we can maximize the benefits it provides with very clear definition of objectives, collaborating actively with all the stakeholders, emphasizing on technology infrastructure, systems integration, standards, and implementation of performance measures.

According to Eysenbach (2001), the challenges for e-Health can be found in the ability of citizen to interact with systems online, enhancing the opportunities for interaction between institutions for information transmission, and new possibilities of communication between different groups located in different geographical locations. All these challenges have also been identified by international organizations, as seen in the resolution on e-Health made by the World Health Assembly (2005), which is an irrefutable testimony of the growing commitment of governments around the world to the vast array of possibilities offered by e-Health. The e-Health can be used to reconcile the need to provide access to quality health services, but at the same time, reducing or at least controlling the high costs of traditional health services (Rodrigues and Risk, 2003). Similarly, West and Miller (2006) found that local governments in recent years have made available to citizen large amounts of information and a wide range of services and resources online. However, issues such as quality of information and services should be taken into account when engaging in such initiatives (Breckons, Jones, Morris and Richardson, 2008). In that sense, Provost, Koompalum, Dong and Martin (2006) have proposed a scale for measuring the quality of the e-Health Websites, which represented the first step in assessing the quality in a standardized way. Additionally, other studies have considered other dimensions important to keep in mind: accuracy, completeness, consistency, readability and accessibility (i.e. Eysenbach, Powell, Kuss and Sa, 2002; Purcell, Wilson and Delamothe, 2002; Jadad and Gagliardi, 1998).

Finally, it is noted that e-government strategies adopted by different countries have not only been gradual and evolutionary, but also the digital divide has not been taken into account because governments have made available online services to citizens without prior training and an adequate policy to reduce the cost of Internet connections at homes. It is essential to analyze different e-Health initiatives to propose a unique taxonomy in which to see reflected their level of development. For this study, we have considered 10 South American countries as a first step of the assessment of e-Health initiatives in the Latin American region.

METHODOLOGY

Based on the literature review, we have identified that although there are some items that focus on different dimensions for evaluating WebPages of e-Health, there has not been an attempt to explain the level of development achieved in these countries. Therefore, this is the first attempt to make a diagnosis of e-Health National Websites in Latin America based on information and services provided to citizens, to define certain stages of development or maturity level by which any e-Health Website can pass throughout its development. With this in mind, a team of researchers have conducted an assessment of each of the factors described in Table 1 for each of the analyzed Websites. Each site was evaluated for a minimum of 3 researchers and then the results have been compared and discrepancies discussed in group.

Factor	Description	Value
F0	Does e-Health National Websites have a prevention section?	If it has a prevention section is 1, 0 otherwise.
F1	Is there a link to this section in the homepage?	If there is a link is 1, 0 otherwise.
F2	Is the information correctly updated?	If it is updated is 1, 0 otherwise. Websites must be reviewed and updated regularly. In particular, it is important that medical information has been updated and the date of update/review would be shown clearly. Although the information is unchanged, it is need to know whether Website responsibles have reviewed it recently to guarantee that they have the right information.
F3	Is there information on major diseases?	If there is information is 1, 0 otherwise. To fulfill with this factor, Websites need to have a list with the main illness, an explanation about them, treatments, specialized centers in the area, etc. Major diseases are contingent to the country because different countries

Factor	Description	Value
		are exposed to different weather conditions, environmental issues, etc.
F4	Is there information on vaccines?	If there is information is 1, 0 otherwise. To fulfill with this factor, Websites need to have a list with the main vaccines, an explanation about them, doses required, period of use, contraindications, etc.
F5	Is there a vaccination schedule?	If there is a vaccination schedule is 1, 0 otherwise. To fulfill with this factor, Websites should have a detailed specification of the appropriate period for each vaccine according to the age of each child.
F6Tel / F6eMail	Does the Website have a phone for contact? Does the Website have an email for contact?	These are two individual factors, for each one is considered 1 if the Website has phone or email respectively, or 0 otherwise. This information is basic whether some problem happens or whether you want to ask questions or offer opinions, because always must be a way to contact the Website responsible in order to promote interaction with citizens, showing that they are heard.
F7	Does the Website have any Privacy Policy?	If the Website has considered any Privacy Policy is 1, 0 otherwise. Typically, Websites tend to follow the path of visitors when they browse on them to determine which pages are visited. However, some health Websites asks the user to "subscribe" to them to access additional content or receive some kind of newsletter. Whatever the case, the Website will get personal information of those interested in these services, so it is recommended that all trustworthy health Website that request such information must specify exactly what it will do with the requested information. The objective is to prevent the fear that sensitive data of users will be reached for other companies for commercial purposes.
F8	Does the Website show where the information comes from?	If the Website shows it is 1, 0 otherwise. Many health and medical Websites post information taken from other Websites or sources. When the information is not made by people from the Website, it must cite the original source.
F9	Does the Website mention if the information is an opinion or a proven fact?	If the Website mentions it is 1, 0 otherwise. In addition to identify who wrote the material posted on the Website, it should describe the scientific or statistical data in which is based the material. The medical facts and figures should have references (e.g. to articles in journals). Also, opinions or advices should be clearly distinguished from factual information (i.e. based on scientific data resulting from research studies).
F10	Does the Website have a committee to review the information?	If the Website has a committee is 1, 0 otherwise. The Website should specify whether the material provided is reviewed by people with excellent professional and scientific training before publication. If the Website has a committee but it is not showed to visitors, the value for this factor will

Factor	Description	Value
		be 0, because the Website does not take advantage of its capabilities.
F11	Does the Website include advertising of pharmaceutical brands/products?	If the Website includes it is 1, 0 otherwise. The idea is to identify whether there are external sponsors in each e-Health National Website, or if there are agreements with companies in the health sector.
F12	Does the Website have any accreditation in health?	If the Website has an accreditation is 1, 0 otherwise. There are codes of conduct for health Websites that include the points outlined above and some more (transparency in the financing, adequate policy for advertising, data confidentiality, etc.). An independent entity is responsible for certifying and evaluating regularly whether the Website meets the requirements, so that when we see the accreditation in the homepage we have more information for its seriousness. The certificate most widespread is the Health On the Net Foundation, known as HON. In the case of HON, it is possible to install a bar in the browser that will indicate if the Website in which we are is accredited.
F13	Does the Website recommend users to visit health professionals to solve their concerns/problems?	If the Website does it is 1, 0 otherwise. Even a well designed, regularly updated, and well maintained Website; it will never replace the knowledge of a healthcare professional. Therefore, the Websites should encourage people to consult a healthcare professional whenever needed.
F14	Does the Website clearly state its purpose or mission?	If the Website clearly states it is 1, 0 otherwise. Citizens should be aware of the purpose and mission of this Website.
F15	Does the Website offer an option for different languages?	If the Website offers it is 1, 0 otherwise. To reach as many people as possible, it is necessary to have the Website presented in more than one language, especially in those countries where there is more than one official language.
F16	Do users need to register in the Website to access information/services?	If users need to register is 1, 0 otherwise. Some pages provide additional information and services to registered users, this is necessary to better understand certain information from users so the Website can customize the information they provide.
F17	Is the privacy policy of the Website accessible from any page, or it can be only reached from the homepage?	If the Privacy Policy can be accessed from every page is 1, 0 otherwise.

Table 1. Factors considered in the study

Factors in this study have been defined using binary values (0: no and 1: yes) to avoid the subjectivity from researchers and to have a first approach of the taxonomy. Another reason to this decision is because this is an exploratory study; hence, we did not have any previous knowledge of the fulfillment of these factors in the analyzed countries. Factors with an average close to 1 will justify a greater level of detail in further studies.

PRELIMINARY RESULTS

Table 2 shows the preliminary findings by countries and factors.

Country	F0	F1	F2	F3	F4	F5	F6T	F6e	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	TOTAL
Argentina	1	1	0	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	9
Bolivia	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	4
Brazil	1	1	0	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	9
Chile	0	0	0	1	1	0	1	1	0	1	1	0	0	0	1	1	0	0	0	8
Colombia	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	7
Ecuador	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	3
Paraguay	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	5
Peru	1	1	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	0	0	12
Uruguay	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	7
Venezuela	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	5
TOTAL	5	5	1	7	8	6	10	9	0	3	2	1	0	0	4	8	0	0	0	

Table 2. Preliminary results by countries and factors

As we can see in Table 2, there are some factors that are not present in any Website. In this sense, F7 and F17 are 0 for all the analyzed countries; it means that users do not know the use that these Websites will do with their information. It is suggested that governments should include the Privacy Policies not only in the homepage but also it can be reached in every page to fulfill the legal requirements related with data protection. F11 has the value of 0 for all countries; it means that national governments do not have agreements with private companies to show advertising related with the health care industry. This situation is not a problem by self, because it is possible that countries want to maintain their independence. F12 has the value of 0 for all governments; this is a very interesting opportunity to improve the perception of quality in each Website because if they obtain some accreditation, the user perceptions of them will be enhanced. The possibility to offer different languages is not used in the analyzed countries; this is an unexpected result because some of the countries in our sample have more than one official language; hence, this is critical point to deal with to reduce the digital gap. Finally, we have detected that all the information is opened for all citizen without any registration requirement; this is a very good strategy to share information with citizens.

In terms with the main diseases, only 7 countries have information about these topics. In terms of vaccination, despite that 8 countries have certain information about them; only 6 have a defined vaccination schedule. These results show the weak efforts that Latin American countries have doing in prevention issues. Moreover, we have to highlight that vaccination schedules are different among countries. This is another improvement opportunity because governments should have the same schedule for basic vaccines, and only some variations based on the specific requirements of each of them.

DIAGNOSIS OF E-HEALTH NATIONAL WEBSITES MATURITY

The next step has been to assess the level of development in our e-Health National Websites sample, analyzing whether the requested factors are covered in the same way in all countries or whether the inequalities are very notorious. With this goal in mind, we have used the dimensions proposed by Esteves and Bohórquez (2009) in order to have a common set of dimensions (Presence, Prevention and Quality) to evaluate the maturity of these initiatives. It is important to highlight that in this study we have considered five more factors than in the previous one. Therefore, to use the dimensions proposed by Esteves and Bohórquez (2009), we have only considered the common factors in both studies. Another consideration is that adding the values for the other factors does not change substantially the ranking in absolute terms, but on the contrary, it increases the inequalities in our findings, reinforcing them. The results are shown in Table 3.

Country	Presence	Prevention	Quality	TOTAL
Peru	4	3	3	10
Argentina	4	2	1	7
Brazil	4	2	1	7
Uruguay	4	2	1	7
Chile	2	2	2	6
Colombia	4	2	0	6
Paraguay	2	3	0	5
Venezuela	2	1	1	4
Bolivia	2	0	1	3
Ecuador	1	0	1	2
TOTAL	29	17	11	

Table 3. Findings ordered by total in absolute terms

These results are quite revealing and show the great inequalities in the region. In terms of the dimensions, the countries studied only account for the 58% of the total possible factors in the Presence dimension. The other two dimensions (Prevention and Quality) are even worse, since they only have 43% and 37% respectively. In terms of countries, Peru is the country with most factors covered, reaching 83% of the full catalog of factors. Peru could be considered a leader in terms of e-Health initiatives and an interesting example to follow in the region, not only because it's the best-ranked country but also it has factors along every dimension; hence, its maturity reached is not focused only in one dimension, but rather on a good combination of all of them. In trying to explain the reason why we found this result, we have done a brief review of the Peru e-Government Master Plan, and we have found that the Ministry of Public Health has the highest level of service automation in Peru while at the same time, the initiative: the improvement of the level of national health through ICT is one of the core components of the Peruvian Digital Agenda (ONGEI, 2009). Therefore, this result is not obtained by chance; it seems that Peru has a well-defined e-Health strategy. The next countries after Peru are Argentina, Brazil and Uruguay with 58% as well as Chile and Colombia with 50 %. These countries could be considered followers; they are implementing their e-Health initiatives relatively well because they are covering the analyzed factors above the average (48%). Finally, we have found the latecomers; these countries are not taking advantage of ICT to get closer to their citizens. Their level of maturity is between 42% of factors covered in Paraguay, to 17% in Ecuador, which is considerably below the region's average (48%).

If we analyze the findings in relative terms, meaning how each country behave in every dimension, we can see that in the Presence dimension only half of the evaluated countries cover at least 50% of the factors in this dimension. In the Prevention dimension, there are 2 countries with 75% of the factors covered and 5 countries with only 50%. However, the Quality dimension is the least covered, only 2 countries have at least 50% of the factors in this dimension (see Figure 1).

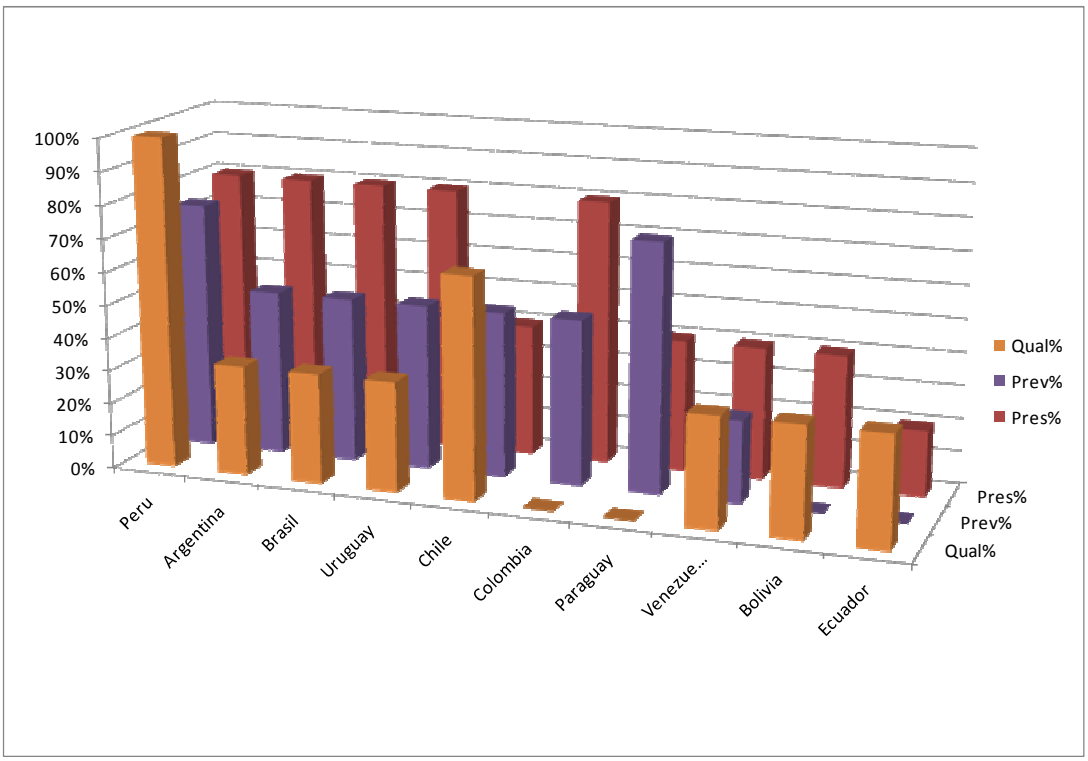

Figure 1. Results by countries and dimensions in relative terms (%)

CONCLUSION

All the analyzed countries have e-Health National Websites; however, the information provided by them is not homogeneous, they do not have the same standards, and they differ in their level of development. In terms of the health issues, only 50% of the analyzed Websites have a specific prevention section. One of the main differences appears comparing the vaccination schedules among countries. According the experts, these differences can create confusion and inequalities when citizens want to access different kind of vaccines in different countries.

The poor level of accreditation in the whole sample proposes interesting opportunities for improvement to enhance the credibility of each Website. The fact that no country has advertising related with the health industry means that governments are working alone, without considering possible synergies and collaboration. However, it is likely that countries want to maintain their independence, because they prefer the transparency in their opinions/facts to avoid misunderstandings with the public opinion.

As we can see, there are a lot of opportunities for improvement in terms of diffusion, participation, and standardization; especially in the Quality dimension in which most of the countries have less than 50% of the factors covered. It should be reflected in collective work among countries and companies in the health industry. In this sense, our taxonomy provides governments with a general approach to the main important factors to elaborate, develop, and implement this kind of solutions. Furthermore, based on these results, governments could reinforce the factors that follow some specific dimension aligned with their specific e-Government strategies. Finally, we need to highlight that this kind of initiatives should be used to reduce the digital gap especially for access of minorities.

Limitation and Future Research

The main limitation in our study is that the assessment among countries was made considering the same weight for all factors. It is likely that some factors could be more important than others, and in this sense, they should have a different weight to emphasize this situation and to get a classification closer to the reality. We encourage scholars to consider the weighting of these factors and the justification of the values considered as a very interesting research avenue.

Following the previous argument, we are also thinking to modify our original questions to analyze different levels of fulfillment. For example, factor F2 could change to: What percentage of the information is correctly updated? These changes make sense now, because we have a better knowledge of the behavior of each factor and we able to deepen the level of analysis for certain factors.

Another future work will be to complete the sample with other Latin American countries as well as to extend our taxonomy to other regions to compare the results. This extension would be useful to understand whether it is possible to build a unique model for developing and developed countries in terms of e-Health National Systems.

Finally, we are planning to add other variables that could be useful to explain our findings. For example, the level of maturity of e-Health National Websites could be related with some demographic or economic variables as well as with the level of Internet penetration or the level of annual expenditure on health in each country. These variables could provide some hints to understand why some countries have better e-Health National Systems than others, enabling the replication of these explanatory variables in late comer countries.

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